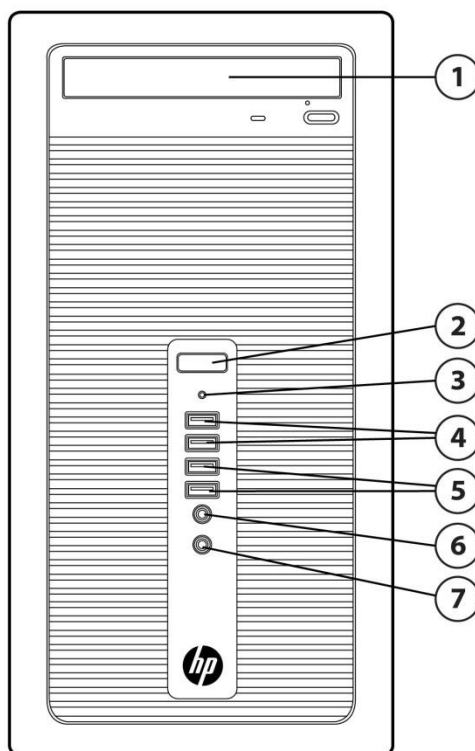


Overview

HP ProDesk 490 G1 Microtower Business PC



1. Drive bay supporting an optical disk drive (optional)
2. Power button
3. PC status LED
4. (2) USB 3.0 ports (black)
5. (2) USB 2.0 ports (blue)
6. 3.5mm microphone jack
7. 3.5mm headphone output

Not Shown

5.25" External Drive Half-Height Drive Bay (located behind removable bezel)

3.5" external drive bay; used for installing a Media Card Reader

- Slots
- (1) PCI Express x16 graphics connectors;
 - (3) PCI Express x1 accessory connectors
 - (1) USB 3.0 header for media card reader
 - (1) Parallel port (optional)

- Bays
- (2) 3.5" internal storage drive bays

- Rear
- (4) USB 2.0 ports; (2) USB 3.0 ports

- I/O
- (1) VGA video port; (1) DVI-D video port; DisplayPort with Multi-Stream support – DP 1.2 (Optional)
 - (1) RJ-45 network connector
 - (1) RS-232 serial port
 - (1) RS-232 serial (optional)
 - 3.5mm audio in/out jacks
 - PS/2 keyboard and mouse ports

Overview

AT A GLANCE

- Expandable, upgradable chassis and system board
- HP developed and engineered UEFI BIOS supporting security, manageability and software image stability
- Intel® H87 Express chipset supporting Intel® 4th generation Core processors, featuring integrated Intel HD Graphics Realtek RTL8151GH-CG GbE LOM integrated network connection
- DDR3 Synchronous Dynamic Random Access Memory (SDRAM)
- Three independent monitor support via VGA and DVI-D video interfaces and optional DisplayPort with Multi-stream support – DP 1.2
- Discrete graphics options available for all platforms
- DTS Sound + audio management software
- Standard and high efficiency energy saving power supply options
- ENERGY STAR® qualified models certified EPEAT® Gold
- Can be configured with multiple drives in a RAID array
- Optional Intel Smart Response Technology disk cache modules
- 1 20GB SATA SSD Cache*

* Intel 313 Series Hawley Creek SSDMAEXC020G301 mSATA 20GB SATA II SLC Internal Solid State Drive (SSD)

Standard Features and Configurable Components

OPERATING SYSTEMS

Preinstalled When Purchased

Windows 8.1 Pro (64-bit)*

Windows 8.1 Pro for Education (64-bit)*

Windows 8.1 (64-bit)*

Windows 8.1 with Bing (64-bit)*

Windows 7 Ultimate (32-bit)**

Windows 7 Ultimate (64-bit)**

Windows 7 Professional (32-bit)**

Windows 7 Professional (64-bit)**

Windows 7 Professional (32-bit) (available through downgrade rights from Windows 8.1 Pro)***

Windows 7 Professional (64-bit) (available through downgrade rights from Windows 8.1 Pro)***

Windows 7 Home Premium (32-bit)**

Windows 7 Home Premium (64-bit)**

Windows 7 Home Basic (32-bit)**

FreeDOS 2.0

Novell SUSE Linux Enterprise Desktop 11

*Not all features are available in all editions of Windows 8.1. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8.1 functionality. See <http://www.microsoft.com>.

**Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See <http://www.microsoft.com/windows/windows-7/> for details.

***This system is preinstalled with Windows 7 Pro software and also comes with a license and media for Windows 8.1 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

PROCESSORS

Intel® 4th Generation Core™ i7 Processors

Intel® Core™ i7-4790 Processor

Up to 4.0 GHz Max. Turbo Frequency (3.6 GHz base frequency)

8 MB cache, 4 cores, 8 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i7-4790s Processor

Up to 4.0 GHz Max. Turbo Frequency (3.2 GHz base frequency)

8 MB cache, 4 cores, 8 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i7-4770 Processor

Up to 3.9 GHz Max. Turbo Frequency (3.4 GHz base frequency)

8 MB cache, 4 cores, 8 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i7-4771 Processor

Up to 3.9 GHz Max. Turbo Frequency (3.5 GHz base frequency)

8 MB cache, 4 cores, 8 threads

Intel HD Graphics 4600

Standard Features and Configurable Components

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i7-4770S Processor

Up to 3.9 GHz Max. Turbo Frequency (3.1 GHz base frequency)

8 MB cache, 4 cores, 8 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® 4th Generation Core™ i5 Processors

Intel® Core™ i5-4690 Processor

Up to 3.9 GHz Max. Turbo Frequency (3.5 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4690S Processor

Up to 3.9 GHz Max. Turbo Frequency (3.2 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4590 Processor

Up to 3.7 GHz Max. Turbo Frequency (3.3 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4590S Processor

Up to 3.7 GHz Max. Turbo Frequency (3.0 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4570 Processor

Up to 3.6 GHz Max. Turbo Frequency (3.2 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4570S Processor

Up to 3.6 GHz Max. Turbo Frequency (2.9 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4670 Processor

Up to 3.8 GHz Max. Turbo Frequency (3.4 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Standard Features and Configurable Components

Intel® Core™ i5-4670S Processor

Up to 3.8 GHz Max. Turbo Frequency (3.1 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4430 Processor

Up to 3.2 GHz Max. Turbo Frequency (3.0 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i5-4430s Processor

Up to 3.2 GHz Max. Turbo Frequency (2.7 GHz base frequency)

6 MB cache, 4 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® 4th Generation Core™ i3 Processors

Intel® Core™ i3-4370 Processor

Up to 3.8 GHz Base Frequency

4 MB cache, 2 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4360 Processor

Up to 3.7 GHz Base Frequency

4 MB cache, 2 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4350 Processor

Up to 3.6 GHz Base Frequency

4 MB cache, 2 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4160 Processor

Up to 3.6 GHz Base Frequency

3 MB cache, 2 cores, 4 threads

Intel HD Graphics 4400

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4150 Processor

Up to 3.5 GHz Base Frequency

3 MB cache, 2 cores, 4 threads

Intel HD Graphics 4400

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4340 Processor

Up to 3.6 GHz Max. Turbo Frequency (3.6 GHz base frequency)

4 MB cache, 2 cores, 4 threads

Standard Features and Configurable Components

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4330 Processor

Up to 3.5 GHz Max. Turbo Frequency (3.5 GHz base frequency)

4 MB cache, 2 cores, 4 threads

Intel HD Graphics 4600

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Core™ i3-4130 Processor

Up to 3.4 GHz Max. Turbo Frequency (3.4 GHz base frequency)

3 MB cache, 2 cores, 4 threads

Intel HD Graphics 4400

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Pentium Processors

Intel® Pentium G3460 Processor

Up to 3.5 GHz Base Frequency

3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Pentium G3450 Processor

Up to 3.4 GHz Base Frequency

3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Pentium G3440 Processor

Up to 3.3 GHz Base Frequency

3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Pentium G3250 Processor

Up to 3.2 GHz Base Frequency

3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1333 MT/s data rate

Intel® Pentium G3240 Processor

Up to 3.1 GHz Base Frequency

3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1333 MT/s data rate

Intel® Pentium G3430 Processor

Up to 3.3 GHz Max. Turbo Frequency (3.3 GHz base frequency)

3 MB cache, 2 cores, 2 threads

Intel HD Graphics

Supports DDR3 memory up to 1600 MT/s data rate

Intel® Pentium G3420 Processor

Standard Features and Configurable Components

Up to 3.2 GHz Max. Turbo Frequency (3.2 GHz base frequency)
3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Pentium G3220 Processor

Up to 3.0 GHz Max. Turbo Frequency (3.0 GHz base frequency)
3 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1600 MT/s data rate

Intel® Celeron Processors

Intel® Celeron™ G1850 Processor

2.9 GHz base frequency
2 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1333 MT/s data rate

Intel® Celeron™ G1840 Processor

2.8 GHz base frequency
2 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1333 MT/s data rate

Intel® Celeron™ G1820 Processor

2.7 GHz base frequency
2 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1333 MT/s data rate
Available February '14

Intel® Celeron™ G1830 Processor

2.8 GHz base frequency
2 MB cache, 2 cores, 2 threads
Intel HD Graphics
Supports DDR3 memory up to 1333 MT/s data rate
Available February '14

CHIPSET

Intel® 8 Series (H87 Express) Chipset

GRAPHICS

Intel HD Graphics on all models (integrated on processor)

AMD Radeon HD 8350 (1GB) FH PCIe x16
AMD Radeon HD 8350 (1GB) PCIe x16
AMD Radeon HD 8470 (2GB) FH
AMD Radeon HD 8490 (1GB) PCIe x16
NVIDIA GeForce GT630 (2GB) FH PCIe x16
NVIDIA NVS 310 x16 1st (no cbl)
NVIDIA NVS 315 (1GB) PCIe x1

Standard Features and Configurable Components

ADAPTERS AND CABLES

- HP DMS-59 to Dual DisplayPort Cable
- HP DMS-59 to Dual DVI Cable
- HP DMS-59 to Dual VGA Cable
- HP DisplayPort to DisplayPort Cable
- HP DisplayPort to DVI-D Adapter
- HP DisplayPort to HDMI Adapter
- HP DisplayPort to VGA Adapter
- HP Serial Port Adapter
- HP Parallel Port Adapter
- HP DisplayPort Cable

STORAGE

SATA Drives

- 500 GB, 7.2K rpm, SATA 6.0 Gb/s, SMART IV, 3.5"
- 1 TB, 7.2K rpm, SATA 6.0 Gb/s, SMART IV, 3.5"
- 2 TB, 7.2K rpm, SATA 6.0 Gb/s, SMART IV, 3.5"

Hybrid Drives

- 500 GB SATA 6G 2.5 (8GB cache) SSHD Drive (with 3.5" adapter)
- 500 GB SATA 6G 2.5 2nd Drive (8 GB cache) SSHD Drive (with 3.5" adapter)
- 1 TB SATA 6G 2.5 (8 GB cache) SSHD Drive (with 3.5" adapter)
- 1 TB SATA 6G 2.5 2nd Drive (8 GB cache) SSHD Drive (with 3.5" adapter)

Solid State Drives

- mSATA 20GB SATA II SLC Internal SSD
- 128 GB SATA 6G 2.5 SSD (with 3.5" adapter)
- 128 GB SATA 6G 2.5 2nd SSD (with 3.5" adapter)

Self-encrypting Solid State Drive

- 120 GB SATA 2.5" Opal1 (SED) Solid State Drive with caddy
- 180 GB SATA 2.5" Opal1 (SED) Solid State Drive with caddy
- 256 GB SATA 2.5" Self-Encrypting (SED) Solid State Drive (with 3.5" adapter)
- 256 GB SATA 2.5" 2nd Self-Encrypting (SED) Solid State Drive installed w/caddy

Optical Disc Drive

- Blu-ray BDXL Writer
- SuperMulti DVD Writer

Standard Features and Configurable Components

DVD-ROM

Media Card Reader

15-in-1 USB2/3 Media Card Reader

MEMORY

| Form Factor | Type | Maximum | # of Slots |
|-------------|---------------------------------|---------|------------|
| Microtower | DDR3 non-ECC Up to 1600 MT/s | 32 GB | 4 UDIMM |

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

Memory modules support data transfer rates up to 1600 MT/s; actual data rate is determined by the system's configured processor. See processor specifications for supported memory data rate.

PERFORMANCE

Intel® Smart Response Technology Disk Cache Modules

32GB SATA Solid State Disk Cache¹

NETWORKING/COMMUNICATIONS

Ethernet (RJ-45)

Realtek RTL8151GH-CG GbE LOM (standard)

Intel Ethernet I210-T1 PCIe x1 Gb Network Interface Card (optional)

Wireless

Intel® Dual Band Wireless-N 7260 802.11 a/b/g/n PCI Express (optional)²

HP WLAN 802.11 a/g/n 2x2 DualBand PCIe x1 Card (optional)

AUDIO/MULTIMEDIA

HD audio with Realtek ALC221 codec (all ports are stereo)

DTS Studio Sound audio management technology

Microphone and headphone front ports (3.5mm)

Line-out and Line-In rear Ports (3.5mm)

Multi-streaming capable

Internal speaker (standard)

KEYBOARDS AND POINTING DEVICES

Keyboard

HP PS/2 Keyboard

HP USB Keyboard

USB Smart Card (CCID) Keyboard

¹ Intel® Smart Response Technology disk cache modules planned to be available December, 2013.

² Intel® Dual Band Wireless-N 7260 planned to be available December, 2013.

Standard Features and Configurable Components

HP USB and PS/2 Washable Keyboard

HP Wireless Keyboard and Mouse Combo*

* Keyboard contains 25% post-consumer recycled plastic material.

Mice

HP PS/2 Mouse

HP USB Mouse

HP USB 1000dpi Laser Mouse

HP USB and PS/2 Washable Mouse

HP BIOS

Key features of the HP BIOS include:

- UEFI specification 2.3.1
- Absolute Persistence Agent – To ensure tracking and tracing services remains active, available in select countries, separate software and purchase of a subscription is required.
- Thermal and power management – The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Business Desktop computer in any enterprise environment.
- Acoustic performance – Industry leading acoustic emissions across the range of operating conditions.
- Serviceability – HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery – HP BIOS provides numerous ways to upgrade HP Business Desktop computers, including BIOS updates from within DOS (DOSFlash), BIOS updates from within Windows (HPQFlash), HP Client Manager, and fail-safe recovery. In addition, the BIOS has the capability to replicate settings across all like systems in the Enterprise using the Replicated Setup option in BIOS Setup, or using tools available from the HP support website in the Business Desktop BIOS Utilities and BIOS Configuration Utility packages.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.

Additional HP BIOS features:

- Power-On password – Helps prevent an unauthorized user from powering on the system.
- Administrator password – Also known as the setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS version cannot be changed and changes cannot be made to BIOS settings using F10 setup or under the OS.
- Advanced Configuration and Power Interface (ACPI) – Represents a significant innovation in power and configuration management, allowing operating systems and applications to manage power based on activity and usage.
- S5 Max Power Savings setting supports EU Lot6 requirement and allows the computer to power down below 1W in S5 (when turned off). When S5 Max Power Savings feature is enabled power to slots is turned off along with WOL functionality.

MANAGEABILITY

Fully manageable and supported by industry-standard HP Client Management Solutions. Optional LANDesk management tools simplify mobile device management and security. Simplify everything from deployment or migration to daily management, security, licensing, and more—and stop downtime before it starts.

- Hardware Management: Inventory, Device config and BIOS updates, HW alerting, Driver updates
- Software Management: Deployment, App Management, Patch Management; Deployment and Migration; Proactive HW and SW Management; Mobile Users and Device Management; Remote Assistance / Help Desk

Standard Features and Configurable Components

- LANDesk Management Suite 9.5 (LDMS) – optional – contact HP representative for part numbers
- Hardware integration with Microsoft System Center Configuration Manager: Client Integration Kit (CIK), Client Catalog, Client Driver Packs
- HP SoftPaq Download Manager (SDM)
- HP System Software Manager (SSM)
- HP BIOS Configuration Utility (BCU)
- HP Driver Packs
- HP Client Management Interface (HP CMI)
- Absolute Persistent Software.

SECURITY

| | |
|---|-----|
| Trusted Platform Module (TPM) 1.2 (Common Criteria EAL4+ certified) | N/A |
| SATA port disablement (via BIOS) | X |
| Drivelock | N/A |
| RAID configurations | X |
| Intel® Identify Protection Technology (IPT) ³ | N/A |
| Serial, parallel, USB enable/disable (via BIOS) | X |
| Optional USB Port Disable at factory (user configurable via BIOS) | X |
| Removable media write/boot control | X |
| Power-On password (via BIOS) | X |
| Administrator password (via BIOS) | X |
| HP Chassis (1 bay) Security Kit | X |
| Solenoid Hood Lock / Sensor | N/A |
| Support for chassis padlocks and cable lock devices | N/A |

ENVIRONMENTAL & REGULATORY

ENERGY STAR® qualified models available

EPEAT® registered where applicable/supported. See www.epeat.net for registration status by country.

Low halogen (chassis, all internal components and modules)

TAA compliant

PORTS

I/O Ports – Standard

| | |
|-----------------|--|
| USB 2.0 | 2 (front); 4 (rear); |
| USB 3.0 | 2 (front); 2 (rear); 1 (internal) |
| Serial (RS-232) | 1 |
| PS/2 | 1 keyboard (purple) 1 mouse (green) |

³ Models configured with Intel Core processors have the ability to utilize advanced security protection for online transactions. IPT, used in conjunction with participating web sites, provides double identity authentication by adding a hardware component in addition to the usual user name and password. IPT is initialized through an HP Client Security module.

Standard Features and Configurable Components

| | |
|---|---|
| Video | 1 VGA 1 DVI-D |
| NOTE: When configured with an Intel Celeron, Pentium or 4th generation Intel Core i3 CPU only two of the available video output ports are active | |
| Audio | Front: headphone/mic Rear: line in/out 3.5mm diameter |
| RJ-45 Network Interface | 1 |
| <u>I/O Ports – Optional</u> | |
| DisplayPort with Multi-Stream support – DP 1.2 | 1 |
| 2nd Serial (RS-232) | 1 |
| Parallel | 1 |
| PCI Express Mini Card | N/A |
| MXM Graphics | N/A |
| mSATA | N/A |
| PCI Express x1 (v2.0) | 3 4.2" full height 6.6" length 10W max. power |
| PCI Express x16 (v2.0) (wired as a x4) | N/A |
| PCI Express x16 (v3.0) | 1 4.2" full height 6.6" length 75W max. power |
| Optional PCI (v2.3) | N/A |

BAYS

| | |
|------------------------------|-----|
| 5.25" external storage drive | 1 |
| 3.5" external storage drive | 1 |
| 5.25" ODD | 1 |
| Slim ODD | N/A |
| 2.5" internal storage drive | N/A |
| 3.5" internal storage drive | 2 |

SERVICE AND SUPPORT

On-site Warranty ¹: One-year (1-1-1) limited warranty delivers one year of on-site, next business day ² service for parts and labor and includes free telephone support ³ 24 x 7. One-year onsite and labor are not available in all countries. Service offers terms up to 5 years by choosing a Care Pack. To choose the right level of service for your HP product, visit HP Care Pack Central: www.hp.com/go/cpc

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

Standard Features and Configurable Components

NOTE 3: Technical telephone support applies only to HP-configured and third-party HP qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

Technical Specifications – Operating Systems and Software

OPERATING SYSTEMS

Preinstalled

Windows 8.1 Pro (64-bit)*
Windows 8.1 (64-bit)*
Windows 7 Professional (32-bit)**
Windows 7 Professional (64-bit)**
Windows 7 Professional (32-bit) (available through downgrade rights from Windows 8.1 Pro)***
Windows 7 Professional (64-bit) (available through downgrade rights from Windows 8.1 Pro)***
Windows 7 Home Basic (32-bit)**
FreeDOS 2.0
Novell SUSE Linux Enterprise Desktop 11

For all Preinstalled operating systems HP provides Microsoft WHQL certified (where applicable) drivers on www.hp.com at the time of product announcement.

Web Support

Windows 7 Enterprise (32-bit or 64-bit)

For all Supported operating systems HP performs testing of the OS, and makes available all HP value add software (OS dependent). Certified drivers are made available on www.hp.com within 30 days of product announcement.

Certified

Novell SUSE Linux Enterprise Desktop 11¹
Red Hat Enterprise Linux 64¹

For all Certified operating systems HP will submit hardware to the operating system vendor for testing and certification. All drivers would be obtained from the operating system vendor, not supplied by HP. Certification will be posted by the operating system vendor.

*Not all features are available in all editions of Windows 8.1. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8.1 functionality. See <http://www.microsoft.com>.

**Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See <http://www.microsoft.com/windows/windows-7/> for details.

***This system is preinstalled with Windows® 7 Professional software and also comes with a license and media for Windows 8.1 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

¹The following features are not supported by Novell SUSE Linux Enterprise Desktop:

- Intel Gigabit CT Desktop NIC
- Broadcom NetXtreme Gigabit Ethernet Plus
- HP Media Card Reader
- HP Client Security
- HP Blu-ray Writer playback of commercial movies
- HP 2nd serial port adapter
- Power Management features

Systems configured with Linux do not qualify for ENERGY STAR®

The following features are not supported by Red Hat Enterprise Linux 64:

- TPM v1.2 embedded Security Chip
- Intel Gigabit CT Desktop NIC
- HP Wireless 802.11b/g/n NIC

Technical Specifications – Operating Systems and Software

- HP Media Card Reader
- HP Blu-ray Writer
- HP 2nd serial port Adapter
- HP USB Smart Card (CCID) Keyboard
- Power Management features

Systems configured with Linux do not qualify for ENERGY STAR®

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

| Included | Windows 7 | Windows 8.1 |
|-----------------------------|---|---|
| Security | HP Client Security: HP Drive Encryption (FIPS 140-2) HP Device Access Manager with Just In Time Authentication HP Password Manager HP File Sanitizer (SSDs and Hybrid Drives not supported) HP Disk Sanitizer External Edition ¹ Microsoft Security Essentials | Disk Sanitizer External Edition ¹ Microsoft Defender |
| MultiMedia | Cyberlink Power DVD, BD Cyberlink Power2Go (Secure Burn) | Cyberlink Power DVD, BD Cyberlink Power2Go (Secure Burn) |
| Communication | | HP Wireless Hotspot |
| HP Value Add | HP ePrint Driver ² HP PageLift HP Support Assistant HP Recovery Disk Creator | HP ePrint Driver ² HP PageLift HP Recovery Manager HP Support Assistant |
| 3rd Party | Adobe Flash Player Bing Search for Internet Explorer 10 Box PDF Complete, Corporate Edition Skype | Bing Search PDF Complete, Corporate Edition Skype |
| Microsoft Products | Buy Office | Buy Office |

¹ Available via download.

² Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see www.hp.com/go/eprintcenter). Requires optional broadband module. Broadband use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary.

Technical Specifications - Graphics

| Intel HD Graphics | | |
|---|--|---------------|
| VGA Controller | Integrated | |
| DisplayPort | Multimode capable; supports HDCP, Display Port Audio (2 streams), HBR2 link rates and Multi-Stream Technology for a maximum of 2 displays (including the integrated panel) | |
| Bus Type | N/A | |
| RAMDAC | N/A | |
| Memory | Intel graphics do not have dedicated memory but utilizes some of the computer’s system memory The amount of memory used for graphics depending on the amount of system memory installed, BIOS settings, operating system, and system load. 32 MB is pre-allocated for graphics use at system boot time. Additional memory can be allocated at boot time by the BIOS for PAVP (Protected Audio Video Playback) support for playback of protected video content. Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use. | |
| Maximum Graphics Memory | Microsoft Windows 7 | Windows 8.1 |
| | Up to 1.7GB | Up to 1.8GB |
| | Note: the actual amount of maximum graphics memory can be less than the amounts listed above depending upon your computer’s configuration. | |
| Maximum Color Depth | 32 bits/pixel | |
| Graphics/Video API Support | 4th Generation Core processors: <ul style="list-style-type: none">• The Processor Graphics contains a refresh of the seventh generation graphics core enabling substantial gains in performance and lower power consumption. Up to 16 EU support.• Next Generation Intel Clear Video Technology HD Support is a collection of video playback and enhancement features that improve the end user's viewing experience<ul style="list-style-type: none">○ Encode/transcode HD content○ Playback of high definition content including Blu-ray Disc○ Superior image quality with sharper, more colorful images• DirectX Video Acceleration (DXVA) support for accelerating video processing<ul style="list-style-type: none">○ Full AVC/VC1/MPEG2 HW Decode• Advanced Scheduler 2.0, 1.0• Windows 7, Windows 8.1, Linux OS Support• DirectX 11.1• OpenGL 4.0• Open CL 1.2 | |
| Supported Display Resolutions and Refresh Rates | | |
| Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP | | |
| Resolution | | Refresh Rates |
| 800x600 | | 60 Hz |
| 1024x768 | | 60 Hz |
| 1152x864 | | 60 Hz |
| 1280x600 | | 60 Hz |

Technical Specifications - Graphics

| | |
|------------|-------|
| 1280x720 | 60 Hz |
| 1280x800 | 60 Hz |
| 1280x960 | 60 Hz |
| 1280x1024 | 60 Hz |
| 1360x768 | 60 Hz |
| 1366x768 | 60 Hz |
| 1400x1050 | 60 Hz |
| 1440x900 | 60 Hz |
| 1600x900 | 60 Hz |
| 1600x1200* | 60 Hz |
| 1680x1050 | 60 Hz |
| 1920x1080 | 60 Hz |
| 1920x1200* | 60 Hz |
| 1920x1440* | 60 Hz |
| 2560x1440* | 60 Hz |
| 2560x1600* | 60 Hz |

* Only supported on displays connected to the external DisplayPort connector.

AMD Radeon HD 8470 Graphics Card

| | |
|--------------------------------|---|
| Form Factor | Full Height |
| Graphics Controller | AMD Radeon HD 8470 |
| Core Clock | 775MHz |
| Memory Clock | 900MHz |
| Memory | 2GB, DDR3, 64-bit wide |
| Bus Type | PCIe Gen2 |
| Max. Power | < 30W |
| Power Source Support | 12V and 3.3V |
| 3D API Support | DX11 |
| HDCP Support | Yes |
| Display Max. Resolution | Digital 2560 x 1600 Analog 2048 x 1536 |
| Supported Graphics APIs | DX11, OpenGL, full 1080p BD (H264) playback in hardware, HDMI 1.4 support |

Supported Display Resolutions and Refresh Rates

Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Technical Specifications - Graphics

| Resolution | Refresh Rates |
|-------------|---------------|
| 800 x 600 | 60 Hz |
| 1024 x 768 | 60 Hz |
| 1280 x 720 | 60 Hz |
| 1280 x 768 | 60 Hz |
| 1280 x 1024 | 60 Hz |
| 1360 x 768 | 60 Hz |
| 1440 x 900 | 60 Hz |
| 1600 x 900 | 60 Hz |
| 1680 x 1050 | 60 Hz |
| 1920 x 1080 | 60 Hz |

NVIDIA NVS 310 Graphics Card

| | |
|---------------------------------|--|
| Introduction | <p>The NVIDIA® NVS™ 310 Graphics Card is a PCI Express low profile form factor graphics add-in card targeted as an active low cost graphics solution for the corporate business and enterprise markets.</p> <p>The NVIDIA® NVS 310 graphics card is an ideal solution for customers requiring a small form factor graphics add-in card for either standard or small form factor PC designs.</p> |
| Performance and Features | <p>The NVIDIA® NVS 310 Graphics Card offers 512 MB of ultrafast DDR3 memory and is capable of supporting up to 2 displays.</p> <p>DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits NR078AA, FH973AT, BP937AA, AS615AA.</p> <p>For a DisplayPort to DisplayPort connections use the optional DisplayPort Cable Kit VN567AA.</p> |
| Form Factor | Low Profile: 2.713 × 6.15 in |
| Graphics Controller | NVIDIA® NVS 310 |
| Memory Clock | 875MHz |
| Memory Size | 512 MB DDR3 |
| Memory Bandwidth | 14 GB/s |
| Max. Power | 19.5W |
| Display Max. Resolution | Up to 2560 x 1600 (digital display) per display |
| Display Output | Up to 2 displays in the following configurations |

Technical Specifications - Graphics

| | | |
|--|---------------------|---|
| | DisplayPort output: | <ul style="list-style-type: none"> Drives two DisplayPort enabled digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking, when connected natively using the 2 DisplayPort connectors on the NVS 310 graphics card Supports 2 monitors up to resolution of 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort Multi-Stream topology technology. |
| | DVI-D output: | <ul style="list-style-type: none"> Drives two digital display at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors Drives two digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors |
| | HDMI output: | <ul style="list-style-type: none"> NVS 310 is capable of driving two high definition (HD) panels up to resolutions of 1920 × 1080P at 60 Hz using DisplayPort to HDMI cable adaptors |
| | VGA display output: | <ul style="list-style-type: none"> Drives two analog display at resolutions up to 1920 × 1200 at 60 Hz using DisplayPort to VGA cable adaptors |

Supported Display Resolutions and Refresh Rates

Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

| Resolution | Maximum Refresh Rates (Hz) by Connection | | | |
|-------------|--|----------------------|---------------------|-------------|
| | DisplayPort to VGA | DisplayPort to DVI-D | DisplayPort to HDMI | DisplayPort |
| 640 × 480 | 85 | 60 | 60 | 60 |
| 800 × 600 | 85 | 60 | 60 | 60 |
| 1024 × 768 | 85 | 60 | 60 | 60 |
| 1280 × 720 | 85 | 60 | 60 | 60 |
| 1280 × 1024 | 85 | 60 | 60 | 60 |
| 1440 × 900 | 75 | 60 | 60 | 60 |
| 1600 × 1200 | 60 | 60 | 60 | 60 |
| 1680 × 1050 | 60 | 60 | 60 | 60 |
| 1920 × 1080 | 60-R | 60-R | 60 | 60 |
| 1920 × 1200 | 60-R | 60-R | | 60 |
| 1920 × 1440 | | | | 60 |
| 2048 × 1536 | | | | 60 |
| 2560 × 1600 | | | | 60 |

Technical Specifications - Graphics

| NVIDIA NVS 315 1GB PCIe x 16 Graphics Card | | |
|---|---|--------------------|
| Introduction | Get efficient dual-display graphics performance in a PCI Express low-profile graphics card with the NVIDIA NVS 315 PCIe x16 1 GB Graphics Card, an ideal desktop graphics solution for professional business and commercial applications. | |
| Performance and Features | The NVIDIA® NVS 315 Graphics Card offers 1 GB of ultrafast DDR3 memory and is capable of supporting up to 2 displays. DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits NR078AA, FH973AT, BP937AA, AS615AA. For a DisplayPort to DisplayPort connections use the optional DisplayPort Cable Kit VN567AA. | |
| Form Factor | Low Profile: 2.713 × 6.15 in | |
| Graphics Controller | NVIDIA® NVS 315 | |
| Memory Clock | 875MHz | |
| Memory Size | 512 MB DDR3 | |
| Memory Bandwidth | 14 GB/s | |
| Connectors | DMS-59 , with support for dual VGA, dual DVI or dual Display Port with the appropriate adapter cable | |
| Display Max. Resolution | Up to 2048 x 1536 VGA; 1920 x 1200 DVI; 2560 x 1600 DisplayPort | |
| Display Output | Up to 2 displays in the following configurations | |
| | <ul style="list-style-type: none">• Dual DVI :<ul style="list-style-type: none">○ Drives two DVI displays using optional HP DMS59 DVI Dual-head Connector Cable DL139A• Dual DisplayPort :<ul style="list-style-type: none">○ Drives two DisplayPort using optional HP DMS-59 to Dual DisplayPort kit XP688AA• Dual VGA :<ul style="list-style-type: none">○ Drives two analog using the included HP DMS-59 to Dual VGA Cable | |
| Supported Display Resolutions and Refresh Rates | | |
| Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP | | |
| Resolution | Maximum Refresh Rates (Hz) by Connection | |
| | Analog Connection | Digital Connection |
| 640 x 480 | 85 | 60 |
| 720 x 480 | 85 | 60 |
| 720 x 576 | 85 | 60 |
| 800 x 600 | 85 | 60 |

Technical Specifications - Graphics

| | | |
|-------------|-----|---------------------|
| 1024 x 768 | 85 | 60 |
| 1280 x 720 | 85 | 60 |
| 1280 x 768 | 85 | 60 |
| 1280 x 1024 | 85 | 60 |
| 1440 x 900 | 75 | 60 |
| 1600 x 1024 | 85 | 60 |
| 1600 x 1200 | 85 | 60 |
| 1680 x 1050 | 75 | 60 |
| 1920 x 1080 | 85 | 60-R |
| 1920 x 1200 | 85 | 60-R |
| 1920 x 1440 | 85 | N/A |
| 2048 x 1536 | 75 | N/A |
| 2560 x 1440 | N/A | 60* |
| 2560 x 1600 | N/A | 60* |
| | | * Display Port Only |

NVIDIA GeForce GT630 Graphics Card

| | |
|---------------------------------|---|
| Introduction | <p>The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Card Graphics Card provides a full height, PCI Express x16 graphics add-in card solution based on the NVIDIA Kepler Architecture GPU. The card is designed to support three display connections through its DVI, and two DisplayPort connectors.</p> <p>An ideal solution for desktop PC customers seeking enhanced 2D and advanced 3D graphics performance, the NVIDIA GeForce GT630 DP (2GB) PCIe x16 Cards are an excellent choice for business users who want run multiple displays from a single graphics board. Engage in Web conferencing or video or photo editing, while improving your everyday business PC experience with better graphics and excellent visual display quality.</p> |
| Performance and Features | <p>The NVIDIA GeForce GT630 DP (2GB) PCIe x16 Cards deliver superior PCI Express (PCIe) Gen 3 features including:</p> <ul style="list-style-type: none"> • Unprecedented flexibility for new applications and enhanced performance • Support for NVIDIA surround technology • Run multiple displays from a single graphics card • Full 16 lane PCIe Generation 3 bus support with peak bandwidth support • Wireless Display ready for future support |
| Form Factor | PCIe x16 Card |
| Graphics Controller | NVIDIA Kepler Architecture GPU |
| Core Clock | 875 MHz |
| Memory Clock | 891 MHz |
| Memory Size | 2 GB DDR3 128 bit |
| Memory Bandwidth | 28.5 GB/s |

Technical Specifications - Graphics

| Display Max. Resolution | 2560 x 1600 digital, 2048 x 1536 analog | |
|--|---|--------------------|
| Display Support | Integrated 400 MHz RAMDAC | |
| Supported Display Resolutions and Refresh Rates Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP | | |
| Resolution | Maximum Refresh Rates (Hz) | |
| | Analog Connection | Digital Connection |
| 640 x 480 | 85 | 60 |
| 800 x 600 | 85 | 60 |
| 1024 x 768 | 85 | 60 |
| 1280 x 720 | 85 | 60 |
| 1280 x 1024 | 85 | 60 |
| 1440 x 900 | 75 | 60 |
| 1600 x 1200 | 85 | 60 |
| 1680 x 1050 | 75 | 60 |
| 1920 x 1080 | 85 | 60-R |
| 1920 x 1200 | 85 | 60-R |
| 1920 x 1440 | 85 | 60 |
| 2048 x 1536 | 75 | 60 |
| 2560 x 1600 | N/A | 60 |

AMD Radeon HD 8350 1GB PCIe x16 DH Graphics Card

| | |
|--|--|
| Introduction | Get stable 2D and advanced 3D graphics performance from the AMD Radeon HD 8350 1 GB PCIe x16 DH Graphics Card, a low profile, PCI Express x16 graphics add-in card based on the AMD Radeon HD 8350 GPU, great for Web conferencing or video and photo editing. |
| Form Factor | PCIe x16 |
| Graphics Controller | AMD Radeon HD 8350 |
| Core Clock | GPU engine operates at 523 MHz |
| Memory | 1GB, DDR3, SDRAM |
| Memory Clock | 875 MHz |
| HDCP Support | Yes |
| Display Max. Resolution | Digital 1920 x 1200 Analog 2048 x 1536 |
| Supported Display Resolutions and Refresh Rates Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP | |

Technical Specifications - Graphics

| | Analog Connection | Digital Connection |
|-------------|-------------------|--------------------|
| 640 x 480 | 85 | 60 |
| 720 x 480 | 85 | 60 |
| 720 x 576 | 85 | 60 |
| 800 x 600 | 85 | 60 |
| 1024 x 768 | 85 | 60 |
| 1280 x 720 | 85 | 60 |
| 1280 x 768 | 85 | 60 |
| 1280 x 1024 | 85 | 60 |
| 1440 x 900 | 75 | 75 |
| 1600 x 1024 | 85 | 60 |
| 1600 x 1200 | 85 | 60 |
| 1680 x 1050 | 75 | 75-R |
| 1920 x 1080 | 85 | 60-R |
| 1920 x 1200 | 85 | 60-R |
| 1920 x 1440 | 85 | N/A |
| 2048 x 1536 | 75 | N/A |
| 2560 x 1440 | N/A | N/A |
| 2560 x 1600 | N/A | N/A |

AMD Radeon HD 8490 1GB PCIe x16 Graphics Card

| | |
|--------------------------------|---|
| Introduction | Get impressive graphics and high resolution dual-display performance in a low profile, PCI Express x16 graphics add-in card based on the AMD Radeon HD 8490 Graphics Processor. Improve your everyday PC, Web conferencing, and video or photo editing. |
| Form Factor | PCIe x16 |
| Graphics Controller | AMD Radeon HD 8490 |
| Core Clock | GPU engine operates at 875 MHz |
| Memory | 1GB, DDR3, SDRAM |
| Memory Clock | 900 MHz |
| HDCP Support | Yes |
| Display Max. Resolution | Digital 2560 x 1600 Analog 2048 x 1536 |

Supported Display Resolutions and Refresh Rates

Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Technical Specifications - Graphics

| | Analog Connection | Digital Connection |
|-------------|-------------------|--------------------|
| 300 x 200 | 85 | 60 |
| 320 x 240 | 85 | 60 |
| 400 x 300 | 85 | 60 |
| 640 x 480 | 85 | 60 |
| 720 x 480 | 85 | 60 |
| 720 x 576 | 85 | 60 |
| 800 x 600 | 85 | 60 |
| 1024 x 768 | 85 | 60 |
| 1280 x 720 | 85 | 60 |
| 1280 x 768 | 85 | 60 |
| 1280 x 1024 | 85 | 60 |
| 1440 x 900 | 75 | 75 |
| 1600 x 900 | 85 | 60 |
| 1600 x 1024 | 85 | 60 |
| 1600 x 1200 | 85 | 60 |
| 1680 x 1050 | 75 | 75-R |
| 1920 x 1080 | 85 | 60-R |
| 1920 x 1200 | 85 | 60-R |
| 1920 x 1440 | 85 | N/A |
| 2048 x 1536 | 75 | N/A |
| 2560 x 1440 | N/A | 60 |
| 2560 x 1600 | N/A | 60 |

Technical Specifications – Hard Disk and Solid State Storage

Introduction:

HP Serial Advanced Technology Attachment (SATA) Hard Drives maximize the performance of HP Business PCs by providing the technologies to meet your increasing storage demands with high-capacity drives offering superior reliability and performance.

SATA provides faster data transfer speeds, better system cooling airflow, more bandwidth, more headroom for speed increases in future generations and better data integrity. A next-generation technology, the SATA interface connects hard drives to the PC platform enabling easy aggregation of multiple hard drives into a single PC. This offers you the additional benefits of dedicated bandwidth, the ability to more easily identify device failures and scalability. The HP ProDesk 490 G1 Series Business PC supports the latest SATA 6.0Gb/s specification.

SMART IV Technology

Self Monitoring Analysis and Reporting Technology (SMART) hard drive technology allows hard drives to monitor their own health and to raise flags if imminent failures are predicted. If the drive determines that a failure is imminent, the SMART hard drive technology enables the intelligent manageability or management software to generate a fault alert. While the current versions of SMART hard drives do a good job monitoring the data on the hard drive media, the ever increasing emphasis on reliability and quality has promoted HP to implement SMART IV technology which constantly checks that the data flow from host interface to media and media to host interface is not compromised. This is accomplished by inserting a 2 byte parity code into every 512 byte block in the data path of the hard drive's Cache RAM. This unique parity checking performed by HP's SMART IV technology hard drives, allows for more complete error detection coverage encompassing the entire data path between the host and the hard drive.

Smart IV is also known as IOEDC: I/O Error Detection Code.

Native Command Queuing

NCQ or Native Command Queuing is a SATA protocol extension that allows the hard drive to have several write or read commands outstanding at the same time. In contrast, normal non-queued operation requires each command to be completed before the next command is issued by the host system. Queuing allows the drive to complete the commands in the order that allows for best overall throughput. It also involves an advanced method of transferring data to or from the host, called First Party Direct Memory Access (FPDMA), which allows the hard drive and the host controller to manage the data transfers for multiple outstanding commands, without involving the host processor. NCQ can contribute to better performance but the results are dependent on many factors, including the access patterns of the various applications and operating system functions that are initiating drive accesses. Enabling NCQ features in the hard drive requires AHCI support from the host system BIOS, controller, and driver. AHCI support is typically implemented in RAID configurations.

Note: GB = 1 billion bytes. Actual available capacity is less.

Redundant Array of Independent Drives (RAID)

Flexible implementation:

- Hard drive information can be viewed within F10 Setup while in RAID mode. Previously, the hard drives will not appear in Drive Configuration when switching to RAID mode.
- DPS Self Test can be executed on physical hard drives while in RAID mode.

NOTE:

RAID 1 is the only RAID configuration offered via factory configurations. The pre-configured systems:

- Are complete RAID systems and have both drives installed. If the MT is configured with three hard disk drives, the third drive is would be un-partitioned and not part of the RAID array
- Have the necessary Option ROM configuration.

Technical Specifications – Hard Disk and Solid State Storage

- [Are pre-loaded and pre-installed with all required Intel software.](#)

[Include a preinstalled operating system that is mirrored mode out of the box.](#)

| HP 1-TB SATA 6G 2.5" 8GB Solid State Hybrid Drive (SSHD) | | |
|--|--|--------|
| Formatted Capacity | 1 TB | |
| Spindle Speed | 5,400 rpm +/- 0.2% | |
| Drive Type | Solid State Hybrid Drive (SSHD) technology with NAND Flash | |
| Interface | Serial ATA (SATA) | |
| Cache Buffer | 64 MB | |
| NAND Flash Commercial Multilevel Cell (cMLC) | 8 GB | |
| Number of Sectors | 976,773,168 | |
| Seek Time (typical reads) | Single Track: | 2.0 ms |
| | Average: | 12 ms |
| Height | 0.374 +/-0.008 in (9.5 +/- 0.2 mm) | |
| Width | 2.750 +/- 0.010 in (69.85 +/- 0.25 mm) | |
| Length | 3.951 +0.008 / -0.010 in (100.35 +0.20 / -0.25 mm) | |
| Weight | 0.254 lb/115 g (max) | |
| Operating Temperature | 32° to 140° F (0° to 60° C) | |

| HP 500 GB SATA 6G 2.5" 8GB Solid State Hybrid Drive (SSHD) | | |
|--|--|--|
| Formatted Capacity | 500 GB | |
| Spindle Speed | 5,400 rpm +/- 0.2% | |
| Drive Type | Solid State Hybrid Drive (SSHD) technology with NAND Flash | |
| Interface | Serial ATA (SATA) | |
| Cache Buffer | 64 MB | |

Technical Specifications – Hard Disk and Solid State Storage

| | | |
|---|--|--------|
| NAND Flash Commercial Multilevel Cell (cMLC) | 8 GB | |
| Number of Sectors | 976,773,168 | |
| Seek Time (typical reads) | Single Track: | 2.0 ms |
| | Average: | 12 ms |
| Height | 0.268 +/- .008 in (6.8 +/- 0.2 mm) | |
| Width | 2.750 +/- 0.010 in (69.85 +/- 0.25 mm) | |
| Length | 3.951 +0.008 / -0.010 in (100.35 +0.20 / -0.25 mm) | |
| Weight | 0.209 lb/95 g (max) | |
| Operating Temperature | 32° to 140° F (0° to 60° C) | |

| HP 128 GB Solid State Drive | | |
|------------------------------------|---|----------------------------------|
| Unformatted Capacity | 128 GB* | |
| Architecture | Multi Level Cell (MLC) NAND | |
| Interface | SATA 6 GB/sec | |
| Dimensions (W x H x D) | 2.75 x 0.276 x 3.96 in (6.985 x 0.7 x 10.05 cm) | |
| Weight | 0.16 lb (73 g) | |
| Bandwidth Performance | Sustained Sequential Read: | Up to 450 MB/ss |
| | Sustained Sequential Write: | Up to 260 MB/s |
| | Random Read (4KB): | up to 46K IOPs |
| | Random Write (4KB): | up to 56K IOPs |
| Latency | Read: | 55ms (TYP) |
| | Write: | 55ms (TYP) |
| Power | DC power requirement: | Min 4.5 V; Max 5.5 V |
| | Total power consumption: | 160 mW (Active) ; <85 mW; (Idle) |
| Useful Drive Life | 1.2 million device hours** | |
| | Operating Temperature: | 32° to 158° F (0° to 70° C) |

Technical Specifications – Hard Disk and Solid State Storage

| | | |
|--|---|------------------|
| Environmental (all conditions, non-condensing) | Relative Humidity (operating): | 5% to 95% |
| | Shock: | 1,500 G/1.0 msec |
| Regulations | UL, CSA, EN 60950-2000, CISPR Pub 22 Class B, CNS 13438, AS/NZS | |
| | CISPR 22:2002 Class B, Korea KCC, CE Mark | |
| * For solid state disk drives, GB means 1 billion bytes. 128GB is the unformatted capacity of this drive before a portion of the drive is reserved for flash management features. Actual capacity will vary by content | | |
| ** The product achieves a mean time between failure (MTBF) based on population statistics not relevant to individual units. | | |

HP 256 GB SATA 2.5” Self-Encrypting (SED) Solid State Drive

| | | |
|--|---|--|
| Unformatted Capacity | 256,186,209,271 bytes | |
| Architecture | Self-Encrypting (SED) Solid State Drive with 25nm MLC NAND Flash and SATA interface | |
| Interface | Serial ATA 2.0 (3.0 Gb/s) | |
| NAND Flash | 25nm MLC NAND Flash | |
| Height | .275 in/7mm | |
| Width | 2.75 in/69.85 mm | |
| Length | 3.95 in/100.5 mm | |
| Weight | 0.161 lb (73 g) | |
| Bandwidth Performance | Sustained Sequential 128k Read: | Up to 450 MB/s |
| | Sustained Sequential 128k Write: | Up to 260 MB/s |
| | Random 4k Read: | Up to 46K IOPs |
| | Random 4k Write: | Up to 56K IOPs |
| Latency | Read: | 55 µs |
| | Write: | 55 µs |
| Power | SATA power consumption: | 160 mW (active average); <85 mW (idle average) |
| Useful Drive Life | 72TB written, up to 40GB/day for 5 years | |
| Environmental (all conditions, non-condensing) | Operating Temperature: | 32° to 158° F (0° to 70° C) |
| | Relative Humidity: | 5% to 95% |
| | Shock: | 1,500 G/1 ms |

Technical Specifications – Hard Disk and Solid State Storage

| HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive | | |
|---|--------------------------------|--------|
| Capacity | 1,000,204,886,016 bytes | |
| Rotational Speed | 7,200 rpm | |
| Interface | Serial ATA 3.0 (6.0 Gb/s) | |
| Buffer Size | 32 MB | |
| Logical Blocks | 1,953,525,168 | |
| Seek Time (typical reads, includes controller overhead, including settling) | Single Track: | 2.0 ms |
| | Average: | 11 ms |
| | Full-Stroke: | 21 ms |
| Height (nominal) | 1 in/2.54 cm | |
| Width (nominal) | Media diameter: 3.5 in/8.89 cm | |
| | Physical size: 4 in/10.2 cm | |
| Operating Temperature | 41° to 131° F (5° to 55° C) | |

| HP 2-TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive | | |
|--|-----------------------------|---------|
| Unformatted Capacity | 2 TB | |
| Rotational Speed | 7,200 rpm | |
| Interface | SATA 6Gb/s NCQ | |
| Cache, Multisegmented (MB) | 64 MB | |
| Seek Time (average) | Read | <8.5 ms |
| | Write | <9.5 ms |
| Height | 1.028 in/26.11 mm | |
| Width | 4.0 in/101.6 mm | |
| Depth | 5.787 in/146.99 mm | |
| Weight | 1.38 lb/626 g | |
| Operating Temperature | 41° to 131° F (5° to 55° C) | |

Technical Specifications - Removable Storage

| HP Blu-ray BDXL Writer Drive | | | |
|------------------------------|--|---|-----------------------|
| Height | 5.25-inch, half-height, tray-load | | |
| Orientation | Either horizontal or vertical | | |
| Interface type | SATA | | |
| Disc capacity | Blu-ray: 128 GB QL, 100 GB TL, 50 GB DL or 25 GB standard DVD: 8.5GB DL or 4.7GB standard | | |
| Dimensions (W x H x D) | 5.8 x 1.7 x 7.1 in (14.8 x 4.2 x 18.0 cm) max | | |
| Weight (max) | 2.1 lb (950g) | | |
| Performance | CD-ROM Read Access time | Random | 140 ms (typical) |
| | | Full Stroke | 230 ms (typical) |
| | DVD-ROM Read Access time | Random | 150 ms (typical) |
| | | Full Stroke | 240 ms (typical) |
| | BD-ROM Read Access time | Random | 250 ms (typical) |
| | | Full Stroke | 350 ms (typical) |
| | Startup Time | (Time to drive ready from tray loading) | |
| | | BD-ROM (SL/DL) | 28S / 28S |
| | | BD-R (SL/DL/TL/QL) | 28S / 28S / 40S / 40S |
| | | BD-RE (SL/DL/TL) | 28S / 28S / 40S |
| | | DVD-ROM (SL/DL) | 18S / 18S |
| | | DVD-R (SL/DL) | 25S / 25S |
| | | DVD-RW | 25S |
| | | DVD+R (SL/DL) | 25S / 25S |
| | | DVD+RW | 25S |
| | | DVD-RAM | 35S |
| | | CD-ROM | 15S |
| | CD Read speeds | CD-ROM up to 40X | |
| | | CD-R up to 40X | |
| | | CD-RW up to 40X | |
| | DVD Read speeds | DVD-RAM up to 5X | |
| | | DVD+/-RW up to 10X | |
| | | DVD+/-R up to 16X | |
| | | DVD+/-R DL up to 8X | |
| | | DVD-ROM up to 16X | |

Technical Specifications - Removable Storage

| | | |
|--|-------------------------------------|---|
| | Blu-ray Read speeds | DVD-ROM DL up to 8X |
| | | BD-ROM (SL/DL) up to 8X |
| | | BD-R (SL/DL) up to 8X |
| | | BD-R (TL/QL) up to 6X |
| | | BD-RE (SL/DL) up to 6X |
| | | BD-RE TL up to 4X |
| | CD Write speeds | CD-R up to 40X |
| | | CD-RW up to 24X |
| | DVD Write speeds | DVD+/-R up to 16X |
| | | DVD+/-R DL up to 8X |
| | | DVD+RW up to 8X |
| | | DVD-RW up to 6X |
| | | DVD-RAM up to 5X |
| | Blu-ray Write speeds | BD-R (SL/DL) up to 6X |
| | | BD-R (TL/QL) up to 4X |
| | | BD-RE (SL/DL/TL) up to 2X |
| Power | Source | SATA DC power receptacle |
| | DC Power Requirement | 5 VDC \pm 5%-100 mV ripple p-p 12 VDC \pm 5%-200 mV ripple p-p |
| | DC Current | 5 VDC -1200 mA typical, 1500 mA maximum 12 VDC -1000 mA typical, 1500 mA maximum |
| Environmental (all conditions non-condensing) | Temperature (operating) | 41° to 122° F (5° to 50° C) |
| | Relative Humidity | 10% to 90% |
| | Maximum Wet Bulb Temperature | 86° F (30° C) |

HP SuperMulti DVD Writer Drive

| | | | |
|-------------------------------|---|-------------------|-----------------------|
| Height | 5.25-inch, half-height, tray-load | | |
| Orientation | Either horizontal or vertical | | |
| Interface type | SATA | | |
| Dimensions (W x H x D) | 5.8 x 1.7 x 6.9 in (14.8 x 4.2 x 17.5 cm) max | | |
| Weight (max) | 2.1 lb (950g) | | |
| Performance | CD-ROM Read Access | Random | 120 ms typical |
| | | Full Stroke | 200 ms typical |
| | DVD-ROM Read Access | Random | 130 ms typical |
| | | Full Stroke | 240 ms typical |
| | CD Media Read Transfer | CD-ROM, CD-R Read | Up to 6000 KB/s (40X) |
| | | CD-RW Read | Up to 4800 KB/s (32X) |

Technical Specifications - Removable Storage

| | | | |
|----------------------------|--------------------------|---|-------------------------------------|
| | | Digital/Analog Audio Playback | Up to 2400 KB/s (16X) |
| | | Digital Audio Extraction (CD-ROM, CD-R) | Up to 6000 KB/s (40X) |
| | | Digital Audio Extraction (CD-RW) | Up to 4800 KB/s (32X) |
| | | Video CD Playback | Up to 2400 KB/s (16X) |
| | DVD Media Read Transfer | DVD-ROM SL Read | Up to 21600 KB/s (16X) |
| | | DVD-ROM DL Read | Up to 10800 KB/s (8X) |
| | | DVD Video Playback | Up to 10800 KB/s (8X) |
| | | DVD Video SL (other than playback) | Up to 21600 KB/s (16X) |
| | | DVD Video DL (other than playback) | Up to 10800 KB/s (8X) |
| | | DVD+/-R | Up to 21600 KB/s (16X) |
| | | DVD+/-R DL | Up to 10800 KB/s (8X) |
| | | DVD+/-RW | Up to 10800 KB/s (8X) |
| | | DVD-RAM | Up to 6750 KB/s (5X) |
| | CD Media Write Transfer | CD-R | Up to 6000 KB/s (40X) |
| | | CD-RW | Up to 600 KB/s (4X) |
| | | CD-RW (High speed) | Up to 1500 KB/s (10X) |
| | | CD-RW (Ultra speed) | Up to 3600 KB/s (24X) |
| | DVD Media Write Transfer | DVD+/-R | Up to 21600 KB/s (16X) |
| | | DVD+/-R DL | Up to 10800 KB/s (8X) |
| | | DVD+RW | Up to 10800 KB/s (8X) |
| | | DVD-RW | Up to 8100 KB/s (6X) |
| | | DVD-RAM | Up to 6750 KB/s (5X) |
| Media Compatibility | Media | Read | Write |
| | CD-ROM | Yes | No |
| | CD-R | Yes | Yes |
| | CD-RW | Yes | Yes |
| | DVD-ROM | Yes | No |
| | DVD-ROM DL | Yes | No |
| | DVD-RAM | Yes | Yes |
| | DVD+/-R | Yes | Yes |
| | DVD+/-R DL | Yes | Yes |
| | DVD+/-RW | Yes | Yes |
| Power Supply | Source | SATA DC power receptacle | |
| | DC Power Requirement | 5 VDC \pm 5% | 100 mV ripple p-p |
| | | 12 VDC \pm 5% | 200 mV ripple p-p |
| | DC Current | 5 VDC | 1000 mA (typical) 1600 mA (max.) |
| | | 12 VDC | 1200 mA (typical) 2000 mA (max.) |
| | | Total Drive Power (Standby Mode) | < 2.5W |

Technical Specifications - Removable Storage

| | | |
|---|---|------------------------------------|
| Rear Panel | SATA Power Connector, 15-pin SATA Data Connector, 7-pin Markings to identify each connector | |
| Environmental conditions (all conditions non-condensing) | Operating Temperature | 41° to 122° F (5° to 50° C) |
| | Storage Temperature | –22° F to 140° F (–30° C to 60° C) |
| | Relative Humidity | 10% to 90% |
| | Maximum Wet Bulb Temperature | 86° F (30° C) |

HP DVD-ROM Drive

| | | | |
|-------------------------------|---|---|------------------------|
| Height | 5.25-inch, half-height, tray-load | | |
| Orientation | Either horizontal or vertical | | |
| Interface type | SATA | | |
| Dimensions (W x H x D) | 5.8 x 1.7 x 6.9 in (14.8 x 4.2 x 17.5 cm) max | | |
| Weight (max) | 2.1 lb (950 kg) | | |
| Performance | CD-ROM Read Access | Random | 120 ms typical |
| | | Full Stroke | 200 ms typical |
| | DVD-ROM Read Access | Random | 130 ms typical |
| | | Full Stroke | 240 ms typical |
| | CD Media Read Transfer | CD-ROM, CD-R Read | Up to 6000 KB/s (40X) |
| | | CD-RW Read | Up to 4800 KB/s (32X) |
| | | Digital/Analog Audio Playback | Up to 2400 KB/s (16X) |
| | | Digital Audio Extraction (CD-ROM, CD-R) | Up to 6000 KB/s (40X) |
| | | Digital Audio Extraction (CD-RW) | Up to 4800 KB/s (32X) |
| | | Video CD Playback | Up to 2400 KB/s (16X) |
| | DVD Media Read Transfer | DVD-ROM SL Read | Up to 21600 KB/s (16X) |
| | | DVD-ROM DL Read | Up to 10800 KB/s (8X) |
| | | DVD Video Playback | Up to 10800 KB/s (8X) |
| | | DVD Video SL (other than playback) | Up to 21600 KB/s (16X) |
| | | DVD Video DL (other than playback) | Up to 10800 KB/s (8X) |
| | | DVD+/-R | Up to 21600 KB/s (16X) |
| | | DVD+/-R DL | Up to 10800 KB/s (8X) |
| | | DVD+/-RW | Up to 10800 KB/s (8X) |
| | | DVD-RAM | Up to 6750 KB/s (5X) |
| Media Compatibility | Media | Read | Write |
| | CD-ROM | Yes | No |
| | CD-R | Yes | No |
| | CD-RW | Yes | No |
| | DVD-ROM | Yes | No |
| | DVD-ROM DL | Yes | No |

Technical Specifications - Removable Storage

| | | | |
|---|---|------------------------------------|-------------------------------------|
| | DVD-RAM | Yes | No |
| | DVD+/-R | Yes | No |
| | DVD+/-R DL | Yes | No |
| | DVD+/-RW | Yes | No |
| Power Supply | Source | SATA DC power receptacle | |
| | DC Power Requirement | 5 VDC \pm 5% | 100 mV ripple p-p |
| | | 12 VDC \pm 5% | 200 mV ripple p-p |
| | DC Current | 5 VDC | 1000 mA (typical) 1600 mA (max.) |
| | | 12 VDC | 1200 mA (typical) 2000 mA (max.) |
| | | Total Drive Power (Standby Mode) | < 2.5W |
| Rear Panel | SATA Power Connector, 15-pin SATA Data Connector, 7-pin Markings to identify each connector | | |
| Environmental conditions (all conditions non-condensing) | Operating Temperature | 41° to 122° F (5° to 50° C) | |
| | Storage Temperature | -22° F to 140° F (-30° C to 60° C) | |
| | Relative Humidity | 10% to 90% | |
| | Maximum Wet Bulb Temperature | 86° F (30° C) | |

Technical Specifications – Memory

System Memory Support

The HP ProDesk 490 G1 Business PC supports the 4th generation Intel® Core™ processor family. Based on a new PC micro-architecture, the processor is designed for a two-chip platform consisting of a processor and Platform Controller Hub (PCH). Unlike previous generations, the 4th generation Intel® Core™ processor includes an Integrated Memory Controller (IMC). The IMC supports DDR3/DDR3L protocols with two independent, 64-bit wide channels each accessing one or two DIMMs.

- Two channels of non-ECC DDR3/DDR3L unbuffered dual in-line memory modules (UDIMM) or DDR3/DDR3L unbuffered small outline dual in-line memory modules (SO-DIMM) with a maximum of two DIMMs per channel
- Single-channel and dual-channel memory organization modes
- Data burst length of eight for all memory organization modes
- Memory data transfer rates of up to 1600 MT/s; actual supported data transfer rate determined by the configured processor.
- 64-bit wide channels
- DDR3/DDR3L system memory I/O voltage of 1.5V
- Theoretical maximum memory bandwidth of:
 - 21.3 GB/s in dual-channel mode assuming 1333 MT/s
 - 25.6 GB/s in dual-channel mode assuming 1600 MT/s

Platform Memory Support

- The Microtower platform supports up to four (4) industry-standard DDR3-SDRAM DIMMs.

CAUTION: You must shut down the computer and disconnect the power cord before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

Technical Specifications – Networking/Communication

| Realtek RTL8151GH-CG GbE LOM Network Adapter | | |
|---|---|------------------------------|
| Connector | RJ-45 | |
| System Interface | Integrated on PCA | |
| Controller | Realtek RTL8151GH-CG Gigabit Ethernet Controller | |
| Memory | 16 KB FIFO packet buffer memory | |
| Data rates supported | 10/100/1000 Mbps | |
| IEEE Compliance | 802.1P 802.1Q 802.3 802.3ab 802.3az 802.3u | |
| Bus architecture | PCI Express | |
| Data transfer mode | PCIe-based interface for active state operation (S0 state) | |
| Power requirement | Requires 3.3V and 1V or just 3.3V with integrated regulators Power consumption 0.425 W | |
| Network transfer mode | Full-duplex | |
| | Half-duplex (not supported for the 1000BASE-T transceiver) | |
| Network transfer rate | 10BASE-T (half-duplex) 10 Mbps | |
| | 10BASE-T (full-duplex) 20 Mbps | |
| | 100BASE-TX (half-duplex) 100 Mbps | |
| | 100BASE-TX (full-duplex) 200 Mbps | |
| | 1000BASE-T (full-duplex) 2000 Mbps | |
| Environmental | Operating Temperature: | 32° to 158° F (0° to 70° C) |
| | Operating Humidity: | 60% RH |
| Management | WOL, auto MDI crossover, PXE, Muti-port teaming, Advanced cable diagnostic | |
| | | |
| Intel® Ethernet I210-T1 Gigabit Network Adapter | | |
| Connector | RJ-45 | |
| System Interface | PCI Express x1 | |

Technical Specifications – Networking/Communication

| | | |
|--------------------------------|--|------------------------------|
| Controller | Intel® I210 Gigabit Ethernet Controller | |
| Memory | Integrated Dual 48K configurable transmit receive FIFO Buffers | |
| Data rates supported | 10/100/1000 Mbps | |
| IEEE Compliance | 802.1P 802.1Q 802.2 802.3 802.3AB 802.3u 802.3x flow control | |
| Bus architecture | PCI-E 2.1 | |
| Data path width | X1, 250 MB/s, Bi-directional interface | |
| Data transfer mode | Bus-master DMA | |
| Hardware certifications | FCC, B, CE, TUV-c, TUVus Mark Canada and United States, TUV-GS Mark for European Union | |
| Power requirement | Aux 3.3 V, 3.0 Watts in 1000 base-T and 1.0 Watts in 100 Base-T | |
| Boot ROM support | Yes 10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps | |
| Network transfer rate | 10BASE-T (half-duplex) 10 Mbps | |
| | 10BASE-T (full-duplex) 20 Mbps | |
| | 100BASE-TX (half-duplex) 100 Mbps | |
| | 100BASE-TX (full-duplex) 200 Mbps | |
| | 1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI bus) | |
| Environmental | Operating Temperature: | 32° to 132° F (0° to 55° C) |
| | Operating Humidity: | 85% at 131° F (55° C) |
| Management | WOL, PXE, DMI, WFM 2.0 | |

Intel Dual Band Wireless-N 7260 802.11 a/b/g/n (2x2) Wireless Network Interface Connection

| | |
|-------------------------------|---|
| Wireless LAN Standards | IEEE 802.11a/b/g/n |
| Interoperability | Wi-Fi certified (802.11 a/b/g/n WMM, WPA, WPA2 and WPS) |

Technical Specifications – Networking/Communication

| | | |
|------------------------------------|---|---|
| | Cisco Compatible Extensions Program compliant with Microsoft Windows 7, Windows Vista and XP. | |
| | NOTE: WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista. | |
| Frequency Band | 802.11b/g/n | 2.402-2.482 GHz |
| | 802.11a/n | 4.9 - 4.95 GHz (Japan) 5.15 - 5.25 GHz 5.25 - 5.35 GHz 5.47 - 5.725 GHz 5.825 - 5.850 GHz |
| Antenna Structure | 2 transmit; 2 receive (2x2) | |
| Data Rates | 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) | |
| Modulation | Direct Sequence Spread Spectrum CCK, BPSK, QPSK, 16-QAM, 64-QAM | |
| Security | <ul style="list-style-type: none"> • IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI | |
| | Note: Check latest software/driver release for updates on supported security features. | |
| Sub-channels | Multinational support with frequency bands and channels compliant to local regulations. | |
| Network Architecture Models | Ad-hoc (Peer to Peer) Infrastructure (Access Point Required) | |
| Roaming | IEEE 802.11 compliant roaming between band Access Points | |
| Output Power | <ul style="list-style-type: none"> • 2.4G: +13.5dBm minimum • 5G: +12dBm minimum | |
| | Note: Maximum output power may vary by country according to local regulations. | |
| Power Consumption | Transmit: 2.0 Watts | |
| | Receive: 1.6 Watts | |
| | Idle mode: 250 mW (WLAN associated) In Power Save Polling mode and on battery power. | |
| | Idle mode: 100 mW (WLAN unassociated) | |

Technical Specifications – Networking/Communication

| | | |
|---|---|---|
| | Radio off: 100 mW (WLAN unassociated) | |
| Power Management | ACPI compliant power management 802.11 compliant power saving mode | |
| Receiver Sensitivity Note: Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation). | 802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) 802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps) 802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) | |
| Antenna Connections | 2 U.FL type connectors (output impedance of 50 ± 2 ohms) | |
| Form Factors | PCI-Express Half-MiniCard | |
| Weight | 0.0068 lb (3.1 g) | |
| Dimensions | 0.12 x 1.06 x 1.18 in (3.1 x 26.8 x 30.0 mm) | |
| Operating Voltage | 3.3V +/- 9% | |
| Temperature | Operating: Non-operating: | 14° to 158° F (-10° to 70° C) -40° to 176° F (-40° to 80° C) |
| Humidity | Operating: Non-operating: | 10% to 90% (non-condensing) 5% to 90% (non-condensing) |
| Altitude | Operating: Non-operating: | 0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m) |
| LED Activity | LED Amber - Radio OFF; LED White - Radio ON | |

High Definition Audio

| | |
|------------------------|--|
| Type | Integrated |
| HD Stereo Codec | Realtek 2-channel ALC221 codec |
| Audio I/O Ports | Front microphone-In (150-K ohm Input Impedance) |
| | Rear Line-In/Microphone input (150-K ohm Input Impedance, function is configurable by audio driver) |
| | Rear Line-Out* (190 ohms Output Impedance, expects at least a 10-K ohm load) |
| | Front Headphone-Out (0.5 Ohm Output Impedance, expects at least a 32 ohm load) Front Microphone/Headphone jack is re-task able to provide Microphone input, line-in or Headphone output to support connecting two headphones to the front of the system. When configured as a second front headphone output, both front headphone outputs are always driven with the same signal. |
| | All ports are 3.5mm |

Technical Specifications – Audio

| | |
|-----------------------------------|--|
| Internal Speaker Amplifier | 1.5W amplifier for the internal speaker only. External speakers must be powered externally. Rear Line-in audio port is re-taskable as either Line-in or Microphone-In. |
| Multi-streaming Capable | Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks. |
| Sampling | 8 kHz - 192 kHz |
| Wavetable Syntheses | Yes – Uses OS soft wavetable |
| Analog Audio | Yes |
| # of Channels on Line-Out | Stereo (Left & Right channels) |
| Internal Speaker | Yes |
| External Speaker Jack | Yes |

Technical Specifications - Input/Output Devices

| HP USB Keyboard | | |
|--------------------------|---------------------------|---|
| Physical characteristics | Keys | 104, 105, 106, 107, 109 layout (depending upon country) |
| | Dimensions (L x W x H) | 18.12 x 6.47 x 0.96 in (46.03 x 16.43 x 2.44 cm) |
| | Weight | 2 lb (0.9 kg) |
| Electrical | Operating voltage | + 5VDC \pm 5% |
| | Power consumption | 50-mA maximum (with three LEDs ON) |
| | System interface | USB Type A plug connector |
| | ESD | CE level 4, 15-kV air discharge |
| | EMI - RFI | Conforms to FCC rules for a Class B computing device |
| | Microsoft® PC 99 - 2001 | Functionally compliant |
| Mechanical | Keycaps | Low-profile design |
| | Switch actuation | 55-g nominal peak force with tactile feedback |
| | Switch life | 20 million keystrokes (using Hasco modified tester) |
| | Switch type | Contamination-resistant switch membrane |
| | Key-leveling mechanisms | For all double-wide and greater-length keys |
| | Cable length | 6 ft (1.8 m) |
| | Microsoft PC 99 - 2001 | Mechanically compliant |
| Environmental | Acoustics | 43-dBA maximum sound pressure level |
| | Operating temperature | 50° to 122° F (10° to 50° C) |
| | Non-operating temperature | -22° to 140° F (-30° to 60° C) |
| | Operating humidity | 10% to 90% (non-condensing at ambient) |
| | Non-operating humidity | 20% to 80% (non-condensing at ambient) |
| | Operating shock | 40 g, six surfaces |
| | Non-operating shock | 80 g, six surfaces |
| | Operating vibration | 2-g peak acceleration |

Technical Specifications - Input/Output Devices

| | | |
|-----------------------------|--|---|
| | Non-operating vibration | 4-g peak acceleration |
| | Drop (out of box) | 26 in (66 cm) on carpet, six-drop sequence |
| | Drop (in box) | 30 in (76.2 cm) on concrete, 16-drop sequence |
| Approvals | UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, KC | |
| Ergonomic compliance | ANSI HFS 100, ISO 9241-4, and TUVGS | |
| Kit contents | Keyboard | Installation Guide |
| | Warranty Card | Safety and Comfort Guide |

HP PS/2 Keyboard

| | | |
|---------------------------------|-------------------------|---|
| Physical Characteristics | Keys | 104, 105, 106, 107, 109 layout (depending upon country) |
| | Dimensions (L x W x H) | 18.22 x 6.47 x 1.1 in (46.28 x 16.43 x 2.79 cm) |
| | Weight | 2 lb (0.9 kg) minimum |
| Electrical | Operating voltage | + 5VDC \pm 10% |
| | Power consumption | 50-mA maximum (with three LEDs ON) |
| | System interface | PS/2 6-pin mini din connector |
| | ESD | CE level 4, 15-kV air discharge |
| | EMI - RFI | Conforms to FCC rules for a Class B computing device |
| | Microsoft PC 99 - 2001 | Functionally compliant |
| | Keycaps | Low-profile design |
| | Switch actuation | 55-g nominal peak force with tactile feedback |
| | Switch life | 20 million keystrokes (using Hasco modified tester) |
| | Switch type | Contamination-resistant switch membrane |
| | Key-leveling mechanisms | For all double-wide and greater-length keys |
| | Cable length | 6 ft (1.8 m) |
| | Microsoft PC 99 - 2001 | Mechanically compliant |
| Environmental | Acoustics | 50-dBA maximum sound pressure level |

Technical Specifications - Input/Output Devices

| | | |
|-----------------------------|---|---|
| | Operating temperature | 32° to 104° F (0° to 40° C) |
| | Non-operating temperature | -22° to 149° F (-30° to 65° C) |
| | Operating humidity | 15% to 80% (non-condensing at ambient) |
| | Non-operating humidity | 15% to 90% (non-condensing at ambient) |
| | Operating shock | N/A |
| | Non-operating shock | 65 inch 2.9 ms, six surface; 30g 266 inch/second; 50g 266 inch/second six surface |
| | Operating vibration | 2-g peak acceleration |
| | Non-operating vibration | Starting at 5 Hz, vary the frequency of vibration from 5 to 500 Hz and back to 5 Hz at a Logarithmic sweep rate of 1 octave per minute. |
| | Drop (out of box) | 26 in (66 cm) on carpet, six-drop sequence |
| | Drop (in box) | 29.93 in (76 cm) on concrete, 16-drop sequence |
| Approvals | CUL, ICES-003 Class B, FCC, CE Mark, TUV GS, VCCI, BSMI, C-Tick, KC | |
| Ergonomic compliance | ANSI HFS 100, ISO 9241-4, and TUVGS | |

HP USB Smart Card (CCID) Keyboard

| | | |
|---------------------------------|---|---|
| Key Benefits: | <ul style="list-style-type: none"> Protects against unauthorized access with smart card technology Delivers even greater security when combined with a HP ProtectTools smart card and the HP ProtectTools Security Software Combination of username and password or pin with a smart card or security token Secures online transactions using digital signatures and certificates Conforms to industry standards for ease of setup and use Delivers long product life and quiet operation with high-impact materials and lubricated keys Spill drain feature | |
| Physical Characteristics | Keys | 104, 105, 106, 107, 109 layout (depending upon country) |
| | Form factor | USB basic smart card keyboard |
| | Colors | Carbonite/Silver |
| | Dimensions (H x W x D) | 18.2 x 6.3 x 1.3 in (46.3 x 16.1 x 3.3 cm) |

Technical Specifications - Input/Output Devices

| | | |
|----------------------|---------------------------|--|
| | Weight | 2 lb (0.9 kg) minimum |
| Electrical | Operating voltage | + 5VDC \pm 5% |
| | Power consumption | 100-mA maximum (with four LEDs ON) |
| | System interface | USB Type A plug connector |
| | ESD | CE level 4, 15-kV air discharge |
| | EMI - RFI | Conforms to FCC rules for a Class B computing device |
| | Microsoft PC 99 - 2001 | Functionally compliant |
| Mechanical | Languages | 30+ available |
| | Keycaps | Standard design |
| | Switch actuation | 55 g nominal peak force with tactile feedback |
| | Switch life | 20 million keystrokes (using Hasco modified tester) |
| | Switch type | Contamination-resistant membrane |
| | Key-leveling mechanisms | For all double-wide and greater-length keys |
| | Cable length | 6 ft (1.8 m) |
| | Microsoft PC 99 - 2001 | Mechanically compliant |
| Environmental | Acoustics | 43-dBA maximum sound pressure level |
| | Operating temperature | 50° to 122° F (10° to 50° C) |
| | Non-operating temperature | -22° to 140° F (-30° to 60° C) |
| | Operating humidity | 10% to 90% (non-condensing at ambient) |
| | Non-operating humidity | 20% to 80% (non-condensing at ambient) |
| | Operating shock | 40 g, six surfaces |
| | Non-operating shock | 80 g, six surfaces |
| | Operating vibration | 2-g peak acceleration |
| | Non-operating vibration | 4-g peak acceleration |
| | Drop (out of box) | 26 in (66 cm) on carpet, six-drop sequence |
| | Drop (in box) | 42 in (107 cm) on concrete, 16-drop sequence |

Technical Specifications - Input/Output Devices

| | | | |
|-----------------------------|------------------------------|--|--------------------------------|
| SmartCard Function | Support | All ISO 7816 smart cards(FIPS 201) | |
| | Interface | Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1) | |
| | Chipset | SCM STCII | |
| | Standard APIs supported | PC/SC, EMV2000, SET | |
| | Power | USB Port | |
| | | Short circuit detection (protects smart card and reader) | |
| | | Power supply compliant with ISO7816 and EMV (5V, 60 mA) | |
| | | Supports 3-V and 5-V cards | |
| | Power consumption | 100-mA maximum draw | |
| | Communication | From card | 9600 bps to 330,000 bps |
| | | From computer | 12 Mbps (USB transfer speed) |
| | Landing mechanism | Contact device | Friction contact |
| | | Card insertions rating | Up to 100,000 insertion cycles |
| | Interface modes | CCID protocol | |
| | Reader performance interface | USB connection | |
| Approvals | | Europe | 2004/108/EC |
| | | USA | USAFCC part 15 |
| Ergonomic Compliance | | ISO 9241-4, TUVGS | |
| Kit Contents | | Keyboard, I/O Security and Documentation CD, warranty card | |

HP USB PS/2 Washable Keyboard

| | | |
|---------------------------------|------------------------|---|
| Physical Characteristics | Keys | 104 (US) Layout, 105 (EU) layout – depending upon country |
| | Dimensions (L x W x H) | 17.67x 6.62 x 1.38 in (449 x 168 x 35 mm) |
| | Weight | 1.7 lb (0.77 kg) minimum |

Technical Specifications - Input/Output Devices

| | | |
|---------------------------------|---------------------------|--|
| Electrical | Operating voltage | + 5VDC \pm 5% |
| | Power consumption | 50-mA maximum (with three LEDs ON) |
| | System interface | USB Type A plug connector |
| | ESD | CE level 4, 15-kV air discharge |
| | EMI - RFI | Conforms to FCC rules for a Class B computing device |
| | Microsoft PC 99 - 2001 | Functionally compliant |
| Mechanical | Keycaps | Stepped -profile design |
| | Switch actuation | 55-g nominal peak force with tactile feedback |
| | Switch life | 20 million keystrokes |
| | Switch type | Contamination-resistant switch membrane |
| | Key-leveling mechanisms | For all double-wide and greater-length keys |
| | Cable length | 7 ft (2.2 m) |
| | Microsoft PC 99 - 2001 | Mechanically compliant |
| | Acoustics | 43-dBA maximum sound pressure level |
| Environmental | Operating temperature | 50° to 122° F (10° to 50° C) |
| | Non-operating temperature | 4° to 149° F (-20° to 65° C) |
| | Operating humidity | 10% to 95% (non-condensing at ambient) |
| | Non-operating humidity | 0% to 95% (non-condensing at ambient) |
| | Operating shock | 40 g, six surfaces |
| | Non-operating shock | 80 g, six surfaces |
| | Operating vibration | 2-g peak acceleration |
| | Non-operating vibration | 4-g peak acceleration |
| | Drop (out of box) | 26 in (66 cm) on carpet, six-drop sequence |
| | Drop (in box) | 42 in (107 cm) on concrete, 16-drop sequence |
| Operating system support | | Windows® 7, Windows Vista, Windows XP Professional |
| Approvals | | UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, C-Tick, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X |
| Ergonomic compliance | | ANSI HFS 100, ISO 9241-4, and TUVGS |

HP PS/2 Mouse

| | | |
|----------------------------------|--|-----------------------------|
| Dimensions (H x L x W) | 1.46 x 2.48 x 4.53 in (3.70 x 6.29 x 11.50 cm) | |
| Weight | 3.53 oz (100g; +10g/- 5 g) | |
| Environmental | Operating temperature | -32° to 104°F (0° to 40° C) |

Technical Specifications - Input/Output Devices

| | | |
|---------------------|---------------------------|---|
| | Non-operating temperature | -4° to 140°F (-20° to 60° C) |
| | Operating humidity | 10% to 90% (non condensing at ambient) |
| | Non-operating humidity | 10% to 90% (non condensing at ambient) |
| | Operating shock | 40 g, 6 surfaces |
| | Non-operating shock | 80 g, 6 surfaces |
| | Operating vibration | 2 g peak acceleration |
| | Non-operating vibration | 4 g peak acceleration |
| | Drop (out of box) | 80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face |
| Electrical | Operating voltage | 5 VDC \pm 10% |
| | Power consumption | 100mA |
| | System consumption | PS/2 mini-din connector |
| | ESD | CE level 4, 15 kV air discharge |
| | EMI-RFI | Conforms to FCC rules for a Class B computing device |
| | Microsoft PC99 - 2001 | Functionally compliant |
| Mechanical | Resolution | 800 DPI |
| | Tracking speed | 10 in/s (25.4 cm/s) maximum |
| | Acceleration | \pm 15% |
| | Switch actuation | 65 \pm 20 gf |
| | Switch life | 3,000,000 operations (using Hasco modified tester) |
| | Switch type | Low force micro-switches |
| | Tracking mechanism life | 80 km |
| | Cable length | 6 ft (1.8 m) |
| | Microsoft PC99 - 2001 | Mechanically compliant |
| Scroll wheel | Width | 6 mm |

Technical Specifications - Input/Output Devices

| | | |
|-----------------------------|---|-----------------------------|
| | Diameter | 22.5 ± 0.2 mm |
| | Maximum rotation force | 50 gf-cm |
| | Switch type | Light force micro-switch |
| | Switch life | 1 million operations |
| | Mechanical life | Minimum 200,000 revolutions |
| Regulatory Approvals | UL/cUL, FCC, CE Mark, TUV/GS, VCCI, KCC, BSMI, C-Tick | |

HP USB Mouse

| | |
|----------------------------------|--|
| Dimensions (H x L x W) | 1.5 x 4.5 x 2.5 in (3.7 x 11.5 x 6.3 cm) |
| Weight | 0.22 lb (0.10 kg) |
| Cable length | 70.9 in (180 cm) |
| System requirements | Available USB port |

HP USB 1000dpi Laser Mouse

| | | |
|----------------------------------|--|---|
| Dimensions (H x L x W) | 1.47 x 4.53 x 2.47 in (37.3 x 114.97 x 62.86 mm) | |
| Weight | 3.360 oz (102g) | |
| Cable length | 70.9 in (180 cm) | |
| System requirements | Available USB port | |
| Environmental | Operating Temperature | 32° to 104° F (0° to 40° C) |
| | Non-operating Temperature | -4° to 140° F (-20° to 60° C) |
| | Operating Humidity | 10% to 90% (non-condensing at ambient) |
| Mechanical | Resolution | 1000dpi |
| | Tracking Speed | 45 cm/sec |
| | Cable Length | 70.9 in (180 cm) |

Technical Specifications - Input/Output Devices

| HP USB PS/2 Washable Mouse | | |
|----------------------------------|---|---|
| Dimensions (H x L x W) | 1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm) | |
| Weight | 4.44 oz (126 g) | |
| Environmental | Operating temperature | –32° to 104°F (0° to 40° C) |
| | Non-operating temperature | –4° to 140°F (–20° to 60° C) |
| | Operating humidity | 10% to 90% (non-condensing at ambient) |
| | Non-operating humidity | 10% to 90% non-condensing |
| | Operating shock | 40 g, 6 surfaces |
| | Non-operating shock | 80 g, 6 surfaces |
| | Operating vibration | 2 g peak acceleration |
| | Non-operating vibration | 4 g peak acceleration |
| | Drop (out of box) | 80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face |
| Electrical | Operating voltage | 5 VDC ± 10% |
| | Power consumption | 100mA |
| | System consumption | PS/2 mini-din connector or USB |
| | ESD | CE level 2 8 kV air discharge |
| | EMI-RFI | Conforms to FCC rules for a Class B computing device |
| | Microsoft PC99 - 2001 | Functionally compliant |
| Mechanical | Resolution | 1000 ± 20% DPI |
| | Tracking speed | 14 in/s (35.56 cm/s) maximum |

Technical Specifications - Input/Output Devices

| | | |
|-----------------------------|---------------------------------------|--|
| | Acceleration | 2 g |
| | Switch actuation | 70 g nominal peak force |
| | Switch life | 3,000,000 operations (using Hasco modified tester) |
| | Switch type | Low force micro-switches |
| | Tracking mechanism life | 8.8 ft total 70 cm+ 2m extension |
| | Cable length | Mechanically compliant |
| | Microsoft PC99 - 2001 | 1000 ± 20% DPI |
| Scroll wheel | Width | 6 mm |
| | Diameter | 1 in (25.4 mm) |
| | Maximum rotation force | 48 rats/sec |
| | Switch type | Light force micro-switch |
| | Switch life | 3 million operations |
| | Mechanical life | Minimum 200,000 revolutions |
| Regulatory Approvals | FCC, CE Mark, ICES-003-B, IP66/NEMA4X | |

Technical Specifications – Power

Unit Environment and Operating Conditions

General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

| | |
|----------------------------------|---|
| Temperature Range | Operating: 50° to 95° F (10° to 35° C)* Non-operating: -22° to 140° F(-30° to 60° C) |
| Relative Humidity | Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient) |
| Maximum Altitude (unpressurized) | Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (9144 m) |

*Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.

Power Supply

| | |
|---|--|
| Standard Efficiency | 300W active PFC (230 VAC input only) |
| High Efficiency* 80 PLUS Bronze | 300W active PFC 82/85/82% efficient at 20/50/100% load (115V) 82/85/82% efficient at 20/50/100% load (230V) |
| Operating Voltage Range | 90 - 264 VAC |
| Rated Voltage Range | 200 - 240 VAC (300W active PFC) 100 - 240 VAC |
| Rated Line Frequency | 50/60 Hz |
| Operating Line Frequency | 47 – 63 Hz |
| Rated Input Current | 4A |
| Rated Input Current with Energy Efficient* Power Supply | 4A |
| Current Leakage (NFPA 99: 2102) | Less than 500 microamps of leakage current at 120 Vac with the ground wire disconnected, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1. Less than 100 microamps of leakage current at 120 Vac with the ground wire intact with normal polarity, as required for Non-patient Electrical |

Technical Specifications – Power

| | |
|------------------------|---|
| | Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1. |
| Power Supply Fan | 80mm Fan (300W PSU) |
| Power cord length | 6.0 ft. (1.83 m) |
| External Power Adapter | |
| Dimensions | N/A |
| Total Cord Length | N/A |

*High efficiency power supply is a requirement for ENERGY STAR® qualification in conjunction with a select range of processors and modules

Technical Specifications – Weights & Dimensions

Weights & Dimensions

(configured with 1 HDD & 1 ODD)

| | |
|---|--|
| Chassis (W x H x D) | 182.88 X 357 X 402 mm 7.2 x 14.05 x 15.82 in |
| System Volume | 26.24 L |
| System Weight* | 7.148 kg 15.75 lb |
| Max Supported Weight (desktop orientation) | N/A |
| Tower Stand (H x W x D) | N/A |
| Packaging (H x W x D) | 535 X 289 X 500 mm 21.06 x 11.37 x 19.68 in |
| Shipping Weight | Est. = ~10.7 kg (packaged) ~23.58 lb |
| Palletization Profile | 4-units per layer 8-layer max. 32-units per pallet |

Technical Specifications – Miscellaneous Features

Management Features

- Advanced Configuration and Power Management Interface (ACPI). Allows the system to wake from a low power mode. Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.
- Intel Wired for Management support; industry wide initiative to make Intel architecture based PCs, servers and mobile computers more inherently manageable out-of-the-box and over the network
- Dual State Power Button; acts as both an on/off button and a suspend-to-sleep button

Serviceability Features

- Dual colored power LED on front of computer to indicate either normal or fault condition
- Diagnostic LED Explanation Table:
 - Number of 1-second red LED blinks followed by a 2-second pause, then repeats:
 - 2 - processor thermal protection activated
 - 3 - processor not installed
 - 4 - power supply failure
 - 5 -- memory error
 - 6 - video error
 - 7 - PCA failure (ROM detected failure prior to video)
 - 8 - invalid ROM, boot block recovery mode
 - 9 - system not fetching code
 - 10 - system hang while loading an option ROM
- HP PC Hardware Diagnostics UEFI:
 - This utility enables hardware level testing outside the operating system on many components. The diagnostics can be invoked by pressing F2 at POST, and is available as a download from HP Support
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- Flash Recovery with Video Configuration Record Software
- 5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- Clear Password Jumper
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions
- Color coordinated cables and connectors
- Tool-less Hood Removal
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- Tool-less Hard Drive, CD & Diskette Removal
- Green Pull Tabs, and Quick Release Latches for easy Identification

Additional Features

Towerable Orientation

Product can be oriented as either a desktop (horizontal) or a tower (vertical)

Drive Lock

Implementation of the industry standard ATA Security feature set. When enabled, it prevents software access to user data on the drive until one or two user-defined passwords are provided.

Drive Protection System

DPS Access through F10 Setup during Boot

Technical Specifications – Miscellaneous Features

| | |
|--|--|
| | <p>A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user</p> <p>Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced</p> <p>The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures</p> |
| SMART Technology (Self-Monitoring, Analysis and Reporting Technology) | Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted |
| SMART I - Drive Failure Prediction | Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count |
| SMART II - Off-Line Data Collection | By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure |
| SMART III - Off-Line Read Scanning with Defect Reallocation | IOEDC: I/O Error Detection Circuitry Detects errors in Read/Write buffers on HDD cache RAM |
| SMART IV - End-to-End CRC for hard drives | Interface in F10 setup provides confirmation of SMART IV support. |

Technical Specifications – Environmental Data

Environmental Data

Eco-Label Certifications & Declarations

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- IT ECO declaration
- US ENERGY STAR®
- EPEAT **Gold** registered in the United States. See <http://www.epeat.net> for registration status in your country.

Tower

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Ultra-slim Desktop model is based on a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Energy Consumption (in accordance with US ENERGY STAR® test method)

| | 115VAC, 60Hz | 230VAC, 50Hz | 100VAC, 60Hz |
|-------------------------------|--------------|--------------|--------------|
| Normal Operation (Short idle) | 24.36 W | 23.68 W | 24.11 W |
| Normal Operation (Long idle) | 20.94 W | 20.62 W | 20.83 W |
| Sleep | 1.46 W | 1.54 W | 1.12 W |
| Off | 0.77 W | 1.18 W | 0.76 W |

Note:

Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Heat Dissipation*

| | 115VAC, 60Hz | 230VAC, 50Hz | 100VAC, 60Hz |
|-------------------------------|--------------|--------------|--------------|
| Normal Operation (Short idle) | 83 BTU/hr | 81 BTU/hr | 82 BTU/hr |
| Normal Operation (Long idle) | 72 BTU/hr | 71 BTU/hr | 71 BTU/hr |
| Sleep | 5 BTU/hr | 5 BTU/hr | 4 BTU/hr |
| Off | 3 BTU/hr | 4 BTU/hr | 3 BTU/hr |

*NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

| | Sound Power (LWAd, bels) | Sound Pressure (LpAm, decibels) |
|-----------------------------|-----------------------------|------------------------------------|
| Typically Configured - Idle | 3.7 | 23 |
| Fixed Disk - Random writes | 3.7 | 23 |

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:

- 10 USB ports
- 4 memory slots
- 3 Mini PCIe half-length slot
- 1 Mini PCIe slot
- 1 " internal bay supporting either one 2.5" or one 3.5 hard drives (HDD/SSD/SED/SSHD)

Technical Specifications – Environmental Data

- 1 5.25" external supporting optical drive

Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.

Batteries

This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater the 1ppm by weight
- Cadmium greater than 20ppm by weight

Battery size: CR2032 (coin cell)

Battery type: Lithium

Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see www.epeat.net
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product contains 10.5% post-consumer recycled plastic (by wt.)
- This product is 91.8% recycle-able when properly disposed of at end of life.

Packaging Materials

- External:
 - PAPER/Corrugated 2380 g
- Internal:
 - PLASTIC/EPE (Expanded Polyethylene) 185 g
 - PLASTIC/Polyethylene low density 45 g
 - PLASTIC/Polypropylene 15 g
- The PAPER/Corrugated packaging material is made from 54.7% recycled content.
- The PLASTIC/EPE (Expanded Polyethylene) packaging materials contains at least 19.5% recycled content.
- The PLASTIC/Polyethylene low density packaging materials contains at least 19.5% recycled content.
- The PLASTIC/Polypropylene packaging materials contains at least 19.5% recycled content.

Common to all Form Factors

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at:

<http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf>):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants - may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins

Technical Specifications – Environmental Data

- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel - finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) - except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

Packaging Usage

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

End-of-life Management and Recycling

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <http://www.hp.com/go/reuse-recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/recyclers>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Hewlett-Packard Corporate Environmental Information

For more information about HP's commitment to the environment:

Global Citizenship Report

<http://www.hp.com/hpinfo/globalcitizenship/qcreport/index.html>

Eco-label certifications

<http://www8.hp.com/us/en/hp-information/environment/ecolabels.html>

ISO 14001 certificates:

<http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/>

[PC_GBU_Product_Design_ISO_14K_Certificate.pdf](http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf)

and

<http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf>

After-Market Options (availability may vary by region)

Communication Devices

Part Number

| | |
|--|---------|
| Intel Ethernet I210 – T1 Gbe NIC | E0X95AA |
| Intel 6205 802.11 a/b/g/n PCIe x1 NIC | E0X93AA |
| Note: The use of any of these optional NIC Cards (wired or wireless) will disable the Intel vPro Technology features. | |
| HP WLAN 802.11 a/g/n 2x2 DualBand PCIe x1 Card | J5C51AA |

Graphics Solutions

Part Number

| | |
|---|---------|
| AMD Radeon HD 8350 Graphics (PCIe x16) | E1C63AA |
| AMD Radeon HD 8490 Graphics Card | E1C64AA |
| Nvidia NVS 310 Graphics (PCIe x16) | A7U59AA |
| Nvidia NVS 315 Graphics (PCIe x16) | E1C65AA |
| HP DisplayPort Cable Kit | VN567AA |
| HP DisplayPort To Dual Link DVI-D Adapter | NR078AA |
| HP DisplayPort To DVI-D Adapter | FH973AA |
| HP DisplayPort to HDMI Adapter | BP937AA |
| HP DisplayPort to VGA Adapter | AS615AA |
| HP DMS-59 to Dual DVI Cable | DL139A |
| HP DMS-59 to Dual DisplayPort Adapter | XP688AA |

Data Storage Drives and Accessories

Part Number

| | |
|---|----------|
| HP 2TB 7200rpm SATA 6.0Gb/s 3.5" Hard Disk Drive | |
| HP 1-TB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive | QK555AA |
| HP 1-TB 10K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive | C2T91AA |
| HP 500-GB 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive | QK554AA |
| HP 128-GB SATA 3.0Gb/s Solid State Drive | QV063AA |
| HP 160-GB SATA 3.0Gb/s Solid State Drive | QV064AA* |
| HP 500-GB SATA 3.0Gb/s Solid State Hybrid Drive | E1C62AA |
| HP Slim Removable SATA Hard Drive Enclosure (frame & carrier) | C1N41AA |
| HP Slim Removable SATA Hard Drive Enclosure (carrier only) | AR639AA |
| HP Chassis (1bay) Security Kit | AR639AA |

*Not available in all regions.

Input Devices

Part Number

| | |
|---|---------|
| HP USB Keyboard | QY776AA |
| HP USB Gray Keyboard | B6B64AA |
| HP USB Smart Card (CCID) Keyboard | BV813AA |
| HP USB Keyboard and Mouse Kit | B1T09AA |
| HP USB Washable Keyboard | VF097AA |
| HP USB and PS/2 Washable Mouse | BM866AA |
| HP USB and PS/2 Washable Keyboard and Mouse Kit | BU207AA |
| HP PS/2 Mouse | QY775AA |
| HP USB Mouse | QY777AA |
| HP USB 1000dpi Laser Mouse | QY778AA |

After-Market Options (availability may vary by region)

HP Wireless Keyboard and Mouse Combination

QY449AA

System Memory

HP 4GB DDR3-1600 (PC3-12800) DIMM

Part Number

B4U36AA

HP 8GB DDR3-1600 (PC3-12800) DIMM

B4U37AA

Multimedia Devices

HP Slim DVD-ROM Drive

Part Number

VP033AA

HP Slim SuperMulti DVD Writer Drive

QS209AA

HP USB HD 720P v2 Business Webcam

D8Z08AA

HP Business Headset

QK550AA

Removable Media Storage

HP 14-in-1 Media Card Reader

Part Number

E5G19AA

HP 15-in-1 Media Card Reader

F4N90AA

Security Devices

HP SFF Wall Mount/Security Sleeve

Part Number

VN570AA

HP UltraSlim Cable Lock

H4D73AA

Stands and Accessories

HP Integrated Work Center Stand (SFF)R

Part Number

QP897AA

HP SFF Tower Stand

VN569AA

HP 490 Tower Bezel Kit

E1C66AA

HP 490 SFF Bezel Kit

E3F27AA

HP Serial Port Adapter (RS-232 compatible)

PA716A

HP Parallel Port Kit

KD061AA

Business Monitors

HP ProDisplay P191

Part Number

C9E54AA

HP ProDisplay P201

C9F26AA

HP ProDisplay P221

C9E49AA

HP EliteDisplay E201

C9V73AA

HP EliteDisplay E221

C9V76AA

HP EliteDisplay E231

C9V75AA

HP LA2405x

D0P36AA

HP EliteDisplay E271i

D7Z72AA

HP EliteDisplay E221c

D9E49AA

HP L2206tm

B0L55AA

LANDesk Software (E-Delivery)

Contact your HP representative for available options.

After-Market Options (availability may vary by region)

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April 2014

After-Market Options (availability may vary by region)

Summary of Changes

| Date of change: | Version History: | | Description of change: |
|------------------------|-------------------------|----------|--|
| June 4, 2014 | From v2.2 to v2.3 | Changed | System weight spec for the MT. |
| July 17, 2014 | From v2.3 to v4 | Upgrade | Change the version so it would sync with the PB |
| August 7, 2014 | From v4 to v5 | Added | Added Windows 8.1 with Bing (64-bit)* Windows 8.1 Pro for Education (64-bit)* from Preinstalled When Purchased |
| | | Change | Change the value in a support memory from 1600 to 1333 |
| August 14, 2014 | From v5 to v6 | Change | In the processors change the speed of "Intel® Pentium G3460 Processor" from 3.2 GHz to 3.5 GHz |
| October 14, 2014 | From v6 to v7 | Change | Values from the environmental data chart |
| October 23, 2014 | From v7 to v8 | Removed | Remove "HP PCI Expansion Kit - E1V16AA" from Stands and Accessories |
| January 21, 2015 | From v8 to v9 | Addition | Added a note about Current Leakage, under POWER |
| | | | |
| | | | |